

IN THE CLAIMS

Please amend the claims as follows:

Claim 1. (Currently Amended) A thermal head comprising:

a metal substrate;

an insulating layer formed on the surface of said metal substrate;

a plurality of heating elements disposed on the surface of said insulating layer, said heating elements being arranged with a predetermined pitch along a plurality of lines in a main scanning direction, said plurality of lines being spaced from each other in a paper feeding direction perpendicular to the main scanning direction; and

a heat radiating element projecting from the surface of said metal substrate to the side where said insulating layer is disposed,

wherein current does not flow through said heat radiating element to said heating elements, and wherein said heat radiating element is disposed at least in a part of a region between said metal substrate and a gap between one line of said heating elements and an adjacent line of said heating elements, and wherein a part, in contact with one line of said heating elements, of said insulating layer and a part, in contact with a directly adjacent line of said heating elements, of said insulating layer are connected to each other in a region in contact with said gap so that heat can be conducted therebetween.

Claim 2. (Original) The thermal head according to claim 1, wherein a part, in contact with one line of said heating elements, of said insulating layer and a part, in contact with a directly adjacent line of said heating elements, of said insulating layer are separated from each other by said heat radiating element.

Claim 3. (Cancelled)

Claim 4. (Original) The thermal head according to claim 1, wherein said heat radiating element is formed integrally with said metal substrate.

Claim 5. (Original) The thermal head according to claim 1, wherein portions, in contact with said heating elements, of said insulating layer protrude in a direction toward said heating elements.

Claim 6. (Original) The thermal head according to claim 1, wherein said heating elements are disposed such that the location, in the main scanning direction, of each heating element is coincident with the location of one of heating elements arranged in an adjacent line.

Claim 7. (Currently Amended) ~~The~~ A thermal head according to ~~claim 1~~ comprising:
a metal substrate;
an insulating layer formed on the surface of said metal substrate;
a plurality of heating elements disposed on the surface of said insulating layer, said
heating elements being arranged with a predetermined pitch along a plurality of lines in a
main scanning direction, said plurality of lines being spaced from each other in a paper
feeding direction perpendicular to the main scanning direction; and
a heat radiating element projecting from the surface of said metal substrate to the side
where said insulating layer is disposed,
wherein current does not flow through said heat radiating element to said heating
elements, wherein said heating elements are disposed such that the location, in the main

scanning direction, of each heating element is shifted by 1/2 pitch relative to the location of one of heating elements arranged in an adjacent line.

Claim 8. (Original) The thermal head according to claim 1, wherein said metal substrate includes a fin formed on a side opposite to the side on which said insulating layer is formed.

Claim 9. (Original) The thermal head according to claim 1, wherein two conductor patterns for supplying a current to each heating element to generate heat are connected to each heating element, on the side opposite to said insulating layer.

Claims 10-25. (Cancelled)

Claim 26. (Previously Presented) The thermal head according to Claim 1, wherein one of said heating elements in one line and one of said heating elements in a directly adjacent line of the one line are separated from each other.

Claim 27. (Previously Presented) The thermal head according to Claim 1, wherein an electrode for supplying a current to each heating element to generate heat is insulated from said metal substrate.

Claim 28. (Previously Presented) A thermal head comprising:
a metal substrate;
an insulating layer formed on the surface of said metal substrate;

a plurality of heating elements disposed on the surface of said insulating layer, said heating elements being arranged with a predetermined pitch along a plurality of lines in a main scanning direction, said plurality of lines being spaced from each other in a paper feeding direction perpendicular to the main scanning direction; and

a heat radiating element projecting from the surface of said metal substrate to the side where said insulating layer is disposed,

wherein said heat radiating element is disposed at least in a part of a region between said metal substrate and a gap between one line of said heating elements and an adjacent line of said heating elements, and

wherein a part, in contact with one line of said heating elements, of said insulating layer and a part, in contact with a directly adjacent line of said heating elements, of said insulating layer are connected to each other in a region in contact with said gap so that heat can be conducted therebetween.

Claim 29. (Previously Presented) A thermal head comprising:

a metal substrate;

an insulating layer formed on the surface of said metal substrate;

a plurality of heating elements disposed on the surface of said insulating layer, said heating elements being arranged with a predetermined pitch along a plurality of lines in a main scanning direction, said plurality of lines being spaced from each other in a paper feeding direction perpendicular to the main scanning direction; and

a heat radiating element projecting from the surface of said metal substrate to the side where said insulating layer is disposed,

wherein said heating elements are disposed such that the location, in the main scanning direction, of each heating element is shifted by $1/2$ pitch relative to the location of one of heating elements arranged in an adjacent line.

Claim 30. (New) The thermal head according to claim 7, wherein a part, in contact with one line of said heating elements, of said insulating layer and a part, in contact with a directly adjacent line of said heating elements, of said insulating layer are separated from each other by said heat radiating element.

Claim 31. (New) The thermal head according to claim 7, wherein said heat radiating element is formed integrally with said metal substrate.

Claim 32. (New) The thermal head according to claim 7, wherein portions, in contact with said heating elements, of said insulating layer protrude in a direction toward said heating elements.

Claim 33. (New) The thermal head according to claim 7, wherein said heating elements are disposed such that the location, in the main scanning direction, of each heating element is coincident with the location of one of heating elements arranged in an adjacent line.

Claim 34. (New) The thermal head according to claim 7, wherein said metal substrate includes a fin formed on a side opposite to the side on which said insulating layer is formed.

Application No. 09/800,504

Reply to Office Action of November 20, 2003

Claim 35. (New) The thermal head according to claim 7, wherein two conductor patterns for supplying a current to each heating element to generate heat are connected to each heating element, on the side opposite to said insulating layer.